MISSOURI BOTANICAL GARDEN

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COVER: Fountain in the Garden Wall of the National Council of State Garden Clubs Headquarters. Photo by Martin Schweig.

The fountain was designed by Mr. William Talbot of Washington, Connecticut. He is a graduate of the Pennsylvania Academy of Fine Arts in Philadelphia, where he was the unprecedented winner of two top awards—the Cresson Award and the Prix de Rome. The National competition conducted by the Artists Guild in St. Louis awarded him first place. Mr. Talbot also created a fountain for the Library in Fitchburg, Massachusetts. He is a member of the Architectural League and Sculptors Guild of New York City.

CONTENTS

Epiphytes
Our Good Neighbor
Summer Flowers for Winter Bouquets
Try Gourds in Your Garden
Missouri Botanical Garden Programs

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Missouri Botanical Garden Bulletin

Vol. XLVIII No. 5 MAY 1960

EPIPHYTES

F. W. WENT

WE propose to reproduce the vegetation of several different tropical regions in the Climatron. This means that there will be typically tropical plants such as palms, paw-paws, banyan trees, bananas, fragrant frangipani, carrion flowers, lacy tree ferns and giant gunneras. In addition to these specific tropical plants, large and small, there will be plantings of certain plant groups largely restricted to the tropics, which are the lianas and the epiphytes.

Any plants which do not have a massive trunk to lift them above the gloom of the surrounding dense vegetation would not seem to have much chance in the tropical jungle, which is one of the densest forests in the world. Many ferns and mosses can grow even in the eternal dusk of the jungle bottom, but most other plants need much more light to thrive. The problem is—how do they rise above the darkness of the forest floor without a tree-like trunk?

There are three solutions to this problem:

1. Climb rapidly up to the top of the jungle giants by means of tendrils, aerial roots, or twining stems. This is the habit of the tropical vines or *lianas*.

2. Attach themselves to branches of a jungle giant obtaining water by sucking it from the hosts since they cannot get it with their own roots from the perpetually moist forest floor. This is done by the tropical mistletoes, which are parasitic on the tree branches to which they attach themselves and into which they bore with their rootlike suckers. These are called *parasites*.

3. Attach themselves to the branches of trees, without parasitizing them, but employing diverse methods to gather or retain water and nutrients. Such non-parasitic plants use tree branches solely for support, and for a place in the sun. These are called *epiphytes*.

In the course of the years many lianas and mistletoes will be growing in the Climatron, but that takes time; the lianas must have trees as support, and the mistletoes need full-grown living trees for their water and food supply. But from the opening day on we can have a good display of epiphytes. During the many years that there were greenhouses at Henry Shaw's garden, epiphytes were grown in them. Many of the spectacular orchids, most of the beautiful ferns, and practically all bromeliads are epiphytes.

As mentioned earlier, epiphytes are plants which grow on trees for support, but which remove no nutrients

or food from the trees on which they live. They cover the branches of the tree, and, therefore, people may think that they are parasites. Yet, this is not the case at all. Therefore, the name "space parasites," which is often used for them, is slightly misleading.

Epiphytes are most common in the tropics. In rain forests particularly, trees may be so completely covered with them that the branches themselves can no longer be seen, and sometimes the branches break under their load, like trees in temperate climates may break under snow or ice loads. In the temperate zones, only small plants, usually mosses and lichens, are found as epiphytes, but, in the tropics, most orchids, many ferns, most bromeliads and occasional representatives of other families occur as epiphytes.

It is obvious that epiphytes or air plants living on the branches of trees have special problems in getting enough water and nutrients, without which no plant can grow. Most jungles exist in areas with abundant rainfall, yet in all of them there are sometimes periods of one or more weeks' duration when there is no rainfall, and then the epiphytes are in difficulty. Since they have no roots which grow down to the ground, they have available only the water which reaches them during the frequent rainstorms. During dry periods they must rely on the

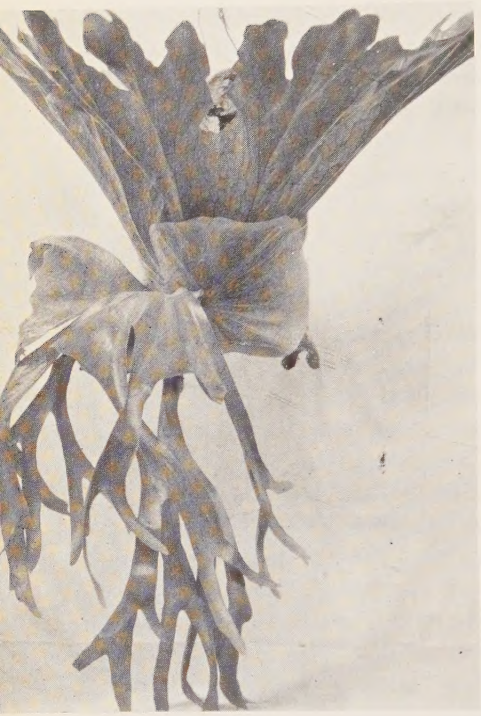
Epiphytes "ride pickaback" on trunks of jungle giants for a place in the sun.

water which is stored in one way or another. We find, therefore, that the better-adapted epiphytes have special mechanisms by which they can store water, or by which they have access to free water. The less well-adapted epiphytes, such as mosses and lichens and even a few ferns, which have no special storage facilities for water, either are able to dry out completely and survive, or they live only in the wettest forests where a sufficient amount of moisture is always available.

The water can be stored either inside the tissues of the plant, such as in the pseudo-bulbs of orchids, or in huge masses of humus which are accumulated by the plants. A very good example of such humus collection is found in ferns. For instance, the bird's-nest fern *(Asplenium nidus)* forms a sort of basket with closely packed leaf bases in which it collects dead leaves which drop off the host tree. These leaves in the basket retain a large amount of water which is then available to the fern because its roots penetrate this mass. At the same time, as the leaves decay, humus is formed which supplies the nest fern with nutrients. Thus the nest fern has a simple, but very effective, means of being continuously supplied with water and nutrients. At its base it simply forms a basket in which all the necessary humus collects. In the bigger nest ferns these humus masses become so huge that the largest earth worms in the world are able to live in them. Obviously, it takes a lot of leaves to supply a two-feet long earth worm with food.

A similar principle of collecting water using the bases of leaves, but in a more complicated form, exists in the Bromeliaceae, the pineapple family. With only few exceptions these plants are epiphytes, and most of them have their leaves in rosettes, and grow rigidly erect. The leaves are almost metallic, and their bases fit so closely against each other that rainwater collects within them. Whereas, the leaf blades are very leathery, and where they connect with the base, they can readily absorb water. In this way each Bromelia, Nidularia or Aechmea stores sufficient water supply and can easily live through one or two weeks of drought. Where water pools exist between the leaf bases water insects such as mosquito larvae live, and to combat malaria during the construction of the Panama Canal, the trees around the construction zone were all

A Bromeliad with its rigidly erect rosette of leaves.



STAGHORN-FERN
The nest-like habit of growth and the two types of leaves.

felled to get rid of the bromeliads thus eradicating mosquitoes.

In the case of the staghorn fern, the same result is attained, but by different means. The staghorn fern, which can become as large as a bird's-nest fern, has two types of leaves—one is the ordinary type which hangs down, remains green and supplies food through its photosynthesis. The other type of leaf is upright and partially envelopes the branch on which the plant grows. These upright leaves form a basket which again can collect the leaves so that humus is available for this huge fern. This, of course, is slightly more advanced in that the plant has two different types of leaves —sterile and fertile, whereas, in the case of the bird's-nest fern, the ordinary leaves act so as to form a basket.

Another method of collecting humus is exemplified by a number of orchids, and especially the large ones, such as epiphytic Cymbidiums and the gigantic *Grammatophyllum speciosum*, which has ten-foot long stems and eight-foot long inflorescences. These orchids have ordinary roots which surround the branch on which they grow and which support the plant. In addition, they form a second type of root which grows upward and soon dies, thus acting as a sort of pitchfork which spears dead leaves as they drop from the host tree so that again humus is accumulated around the base of their stems.

An Orchid with its pseudobulbs and the pitchfork like modified leaves which grow upward to catch and hold materials for humus.

The most refined method of water collection by an epiphyte is found in *Dischidia rafflesiana* belonging to the milkweed family. This plant has long trailing stems, which are only occasionally attached to branches by weak rootlets. It has perfectly normal, small, opposite, succulent leaves. Its peculiarity lies in a second type of leaf which it produces. These leaves are

The Epiphyte *Dischidia rafflesiana* showing both the small normal leaves and the larger specially adapted pitcher type leaves.

also opposite, but are much larger and have the form of pitchers with a small opening where they fit to the leaf stalk. Through that opening not only the inside of the pitcher is in contact with the outside, but also an aerial root enters the auricle-shaped pitcher. When the pitcher hangs down, with its opening up, rain water can run into it, and that water is available to the plant during dry period by means of the root inside. But the pitcher opposite the hanging leaf points upward, with its opening down. In this pitcher we invariably find an antnest. These ants let their refuse lie around, and the root inside the pitcher can absorb nutrients from their droppings.

There are quite a number of other epiphytes which have hollow stems such as orchids, or rhizomes such as ferns in which ants live. Most peculiar among these ant epiphytes are *Myrmecodia* and *Hydnophytum,* members of the coffee family. Their stem base is swollen to a large, sometimes even huge, tuber which is provided with a system of hollows and corridors particularly adapted as antnests.

In all these plants special structures provide room for ants, and the untidier the ants are, and the more refuse they bring to these epiphytes, which otherwise would live under starvation conditions, the better the plants are. Here it pays for the tenants to neglect their rooms, and thus provide food for their landlady.

After their seeds get caught in cracks of the bark, or in moss cushions on the branches of trees almost all epiphytes start as tiny seedlings. While very small, they do not need a firm attachment. But later, as they grow larger, they form roots that encircle the branch with which they can support themselves. We often find two different kinds of roots in these epiphytes: those which encircle the branch, soon die, providing only attachment; and the feeder roots which follow along the branch and seek pockets of humus.

There is one epiphyte which never forms any roots, and remarkably enough, this is the most successful of all. It is the Spanish moss, *Tillandsia useneoides.* It hangs down in garlands from trees all over our South, from the Carolinas to Tennessee, to Florida, and through the jungles of South America. This plant scarcely looks like a higher order of plant. It consists of long gray stems with gray linear leaves which are draped over the branches of trees. Special hairs with which stems and leaves are covered, collect and absorb water as it runs off branches of the host tree during a rain, and in which minute amounts of nutrients are present, dissolved from the host. The more cells of the host which die, the more nutrients in this run-off water, and the better the Spanish moss grows. It does not kill trees, as is often claimed, but it grows best on dying trees. However, it does not thrive on telephone wires or other structures which do not give off nutrients.

A branch of a tree is a very peculiar spot for seeds to reach and to stick to. Therefore, epiphytes must have special adaptations so that their seeds (or spores in the case of ferns) become attached to branches, instead of dropping to the ground. These adap-

tations have gone in two directions:

1. Seeds or spores are produced in such enormous quantities making it possible for one to occasionally get attached on a branch in an advantageous spot. Fern spores are produced by the millions by each plant. For instance, one single leaf of a bird's-nest fern may produce ten million spores, and with the total of a hundred leaves per plant, this means that each germinated spore could give rise to a plant which would multiply this spore a billion times. Most ferns have a further mechanism by which the sporangia in which the spores are formed open only when the weather is dry, so that the spores which are ejected may be carried away by wind, and not get precipitated or washed away immediately by rain.

Orchids are plants which reproduce themselves by the germination of their seeds. Orchid seeds are also formed by the millions by the mature plant. A seed pod of an orchid contains anywhere from ten to one hundred thousand seeds. These are very light. The tiny seed is covered by a thin membrane, the seed coat, which acts as a sail. Orchid seeds are so small that they consist of less than a hundred cells, which are not differentiated. Because of their smallness, they do not contain storage food, and, therefore, the seedlings have to live symbiotically with a fungus which supplies the necessary food for about one year's time, until a root and a leaflet are formed which then can take over the food supply for the plant.

2. Another group of epiphytic plants has much larger seeds, which are imbedded in a fruit which is eaten by birds or other animals living on trees. These seeds pass through the intestinal tract of these animals and have a good chance to become deposited, in the droppings, on the branch of another tree. This happens, e.g., with the fig seeds, and also with many epiphytic members of the blue-berry family. Many bromeliads have juicy fruits such as pineapple; and so have Araceae as in the Calla Lily family, and Rhipsalis, an epiphytic cactus.

Thus we have seen that epiphytes have many interesting and effective adaptations to have access to extra water and food, to attach themselves to the branches on which they live, and to get their seeds or spores deposited in the right environment.

There is another group of epiphytes which is always found in certain ant nests in trees in the tropics. Such ant nests are called ant-gardens, which seems a very appropriate name. They can be recognized from afar as green clumps, much larger than most other epiphytes. The fruits of the plants living in these ant nests are collected by the ants for food, often because they are rich in oil. The seeds which are not eaten, and which the ants leave in their nests, germinate and send their roots through the ant nest. This fortifies the nest, and the droppings of the ants provide food for the new plants. This is a perfect case of symbiosis between ants and plants, each benefitting from the other.

OUR GOOD NEIGHBOR

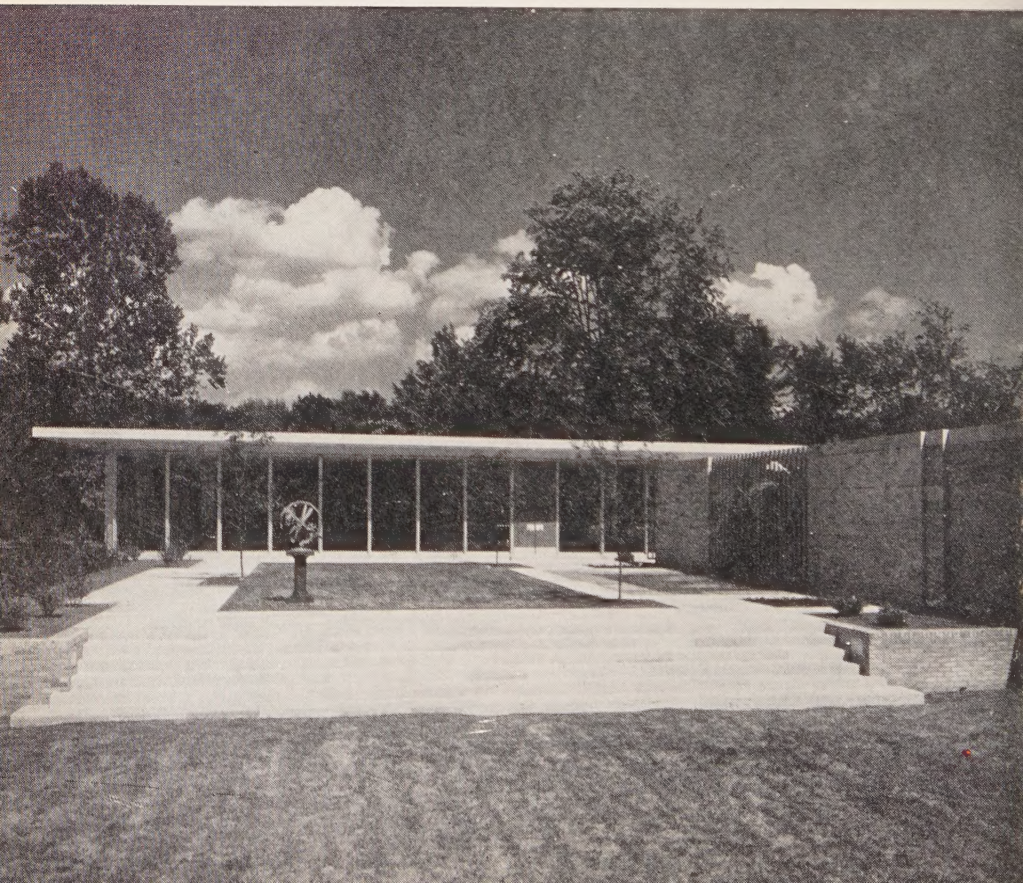
ONE year ago in May, our "Good Neighbor," the National Council of State Garden Clubs—familiarly known as the National Home—celebrated its 30th anniversary and dedicated its new home on Magnolia Avenue. During the past year the Missouri Botanical Garden and the National Home have enjoyed a mutually pleasant and profitable association, and look forward to continued and increasing cooperation.

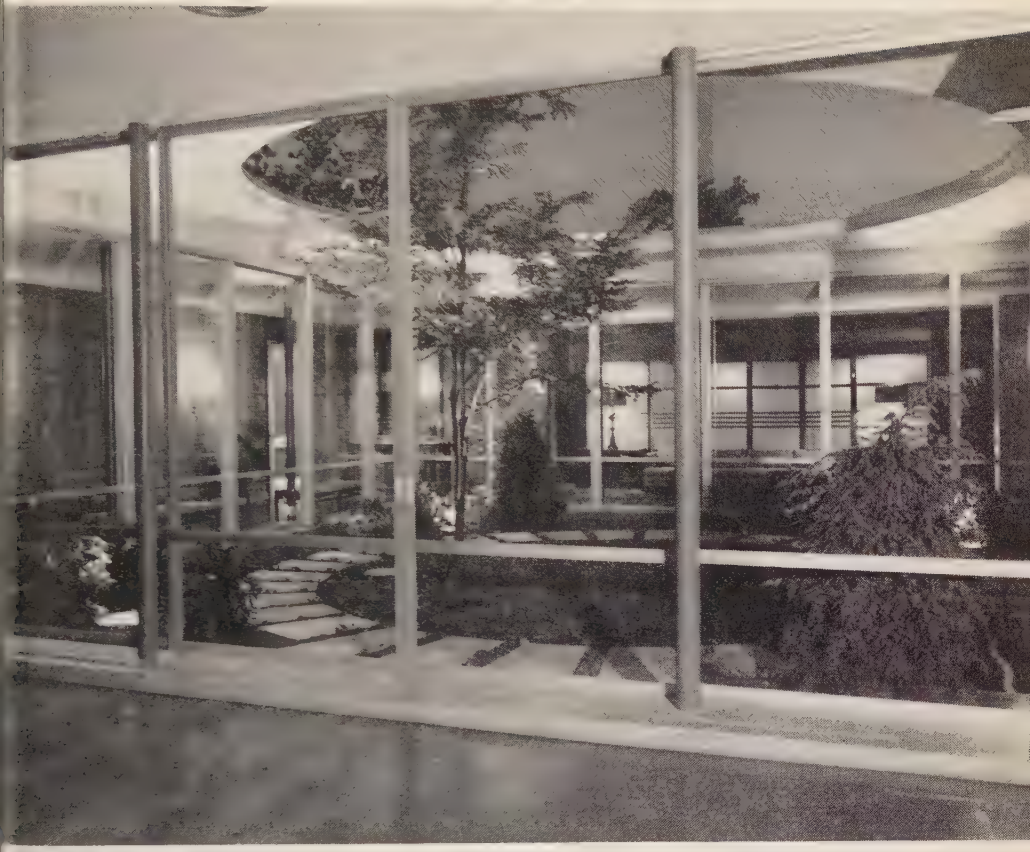
The National Council is presently composed of 47 State Federations and the District of Columbia, 14,171 clubs and 415,852 members. All work and services are on a volunteer basis, with the exception of the Headquarters Staff. In addition, the National Council proudly recognizes as Affiliate Members, 16 horticultural organizations throughout the world; from Canada to Mexico and to South America; from Bermuda to South Africa and to Australia.

The work of the National Council is set forth in its purposes, which are as follows:

To co-ordinate the interests and activities of the State Federations of

Upper terrace of the National Home





Patio of the National Home

Garden Clubs together with similar organizations in foreign countries.

To aid in the protection and conservation of natural resources, and to encourage civic beauty and roadside development.

To assist in establishing and maintaining botanical gardens and horticultural centers for the advancement of science.

To advance the fine art of gardening through the study of horticulture and landscape design, and to assist deserving students, by means of scholarships, in these fields of endeavor.

To co-operate with other agencies furthering the interests of horticulture, conservation and beautification.

The new National Home is built on land formerly a part of Shaw's Garden. In the future the Garden and the National Home will work very closely together in the development of the grounds where they adjoin. In the Master Plan now developed for the Missouri Botanical Garden, no separation of grounds is contemplated, and we envisage that the landscaping of these grounds will be treated as a unit. Thus we will be "Good Neighbors" in the finest sense of the word.—E.L.E.

SUMMER FLOWERS FOR WINTER BOUQUETS

GEORGE S. BUNTING

MANY of us like to have flowers in our homes the year round. In summer, of course, we can just walk out into the garden and cut a bouquet. But in winter, the chief source of cut flowers is the florist, and when we think of the cost of a few blooms, we often decide that the price is limiting. Some of us, therefore, settle for winter greenery or foliage plants, while others turn to—dare I accuse a gardener of it—artificial flowers! Actually, it is easy to *grow* flowers for winter bouquets in your own garden during the summer. There are several kinds of flowers that have the capacity to be dried and still retain much of their original color, shape, and beauty. Not only can these flowers be arranged into attractive winter bouquets, but they can also be an important part of your summer garden, furnish color and cut flowers during the growing season.

Most of us are familiar enough with the woody plants that produce attractive dried fruits for winter bouquets, such as the lovely bittersweet *(Celastrus scandens)*, wax myrtle or bayberry *(Myrica* spp.*)*, and the Japanese barberry *(Berberis thunbergii)*. But there are several annuals and a few perennials which, planted in the spring, will produce flowers the same or the following season. Most of them are old favorites well known to our grandmothers but no longer popular, having given way to newer introductions. Some of the best flowers for summer as well as winter beauty are discussed below.

Gomphrena globosa. The "prettyboys" of grandma's garden.

GOMPHRENA GLOBOSA

The globe amaranth, in past decades known as prettyboys, is of outstanding merit. It forms a dense plant about 18 inches tall, and nearly as broad, virtually covered with dense globular heads of magenta, or of pale pink or white, about ¾ inches across. Flowers are produced all season, and the plants are excellent for bedding, or they may be spaced occasionally about the garden for a spot of color here and there. In this latitude globe amaranths will often seed themselves, and seeds saved from plants grown year after year may give good results. Each flower head is borne on a straight stem 6″ or more long, and often three such stems arise from one joint. For drying, it is desirable to cut the stems just above such a joint, otherwise the stems may collapse at that point upon drying. The heads should be cut when the flowers are at their peak of beauty and expansion, tied into bunches, and hung upside down in reduced light until completely dry. (The attic is usually a good place.) Select only the best heads on the longest stems for drying, and continue to cut and dry more as they are produced throughout the season. The beauty of the plants will not be affected.

HELICHRYSUM BRACTEATUM

One of the most attractive species for dried bouquets is the strawflower. It is, however, the least showy garden subject discussed here. The plants are often quite slender and up to 4 feet tall, and bear the flower heads mostly on long stems at the top of the plant. Each plant produces many heads of either golden or rose. It is important to plant the seeds early, for the plants are rather slow to start. But even a few plants well grown can make sufficient flowers for several showy bouquets. The secret to good dried strawflowers is to cut them when they have enlarged, but before the bracts (the colored petal-like structures) begin to open. Even some smaller "buds" will be attractive in your winter bouquet. To dry for winter use, cut the stems as long as you desire them, remembering that for arrangements it is often best to have just one flower head per stem. Remove the leaves from the cut stems, tie the strawflowers into bunches, and hang them upside down away from strong light until completely dry. Cut a few heads frequently as they reach the proper stage of development. If the heads are too mature when cut, the center part will "shed" upon drying.

Similar to *Helichrysum* is Acroclinium *(Helipterum roseum)*. The plants grow to about 24 inches tall and produce rose or white heads about 2 inches across. They may be treated in the same way as the strawflowers.

LIMONIUM spp.

Statice (the final "e" is pronounced) seems to be rarely grown in the home garden these days, yet surely deserves a place. There are at least three species offered for sale, and they come in a variety of colors from purple and lavender to pink and white, and also bright yellow. They require no special treatment other than giving them a sunny location. *Limonium bonduelli* is the yellow-flowered one, and grows to 24 inches tall. It may be treated as a biennial, or if started early enough,

flowers may be produced in one season. A bright pink-flowered species, *L. suworowi* is an annual that grows about 18 inches tall. By far the most widely grown sort is *L. sinuata,* a perennial species up to 30 inches which may be had in shades of pink or blue, and white. The flower stalks of none of these species are large, but they are very showy. They may be cut as desired, and dried in the vase or otherwise.

CELOSIA ARGENTEA var. CRISTATA

An old favorite is cockscomb, today enjoying new popularity because of the new short-stemmed (12 inches) strain which lends itself to bedding. Of course, the tall strain is still available. Both have equally large heads, and either will serve well for winter bouquets. The plants need no special attention, but undoubtedly will make better plants when properly fertilized. Cockscombs should be cut and dried before the seeds mature to prevent the otherwise endless dropping of seeds thereafter. Until they are dry, they should be hung upside down in reduced light. It is true that the color of cockscombs will sometimes fade a little after drying. By trying out different times of cutting and methods of drying, you will learn how to obtain the best results.

GYPSOPHILA PANICULATA

Babysbreath can be used as a filler in the garden, and in cut bouquets when fresh or dried. The numerous small white flowers are arranged on a many branched stalk to 36 inches tall, usually produced in June and July. It is a perennial, but early planting may give flowering material the first year. The cut stems should be hung upside down while drying. Remember that they are brittle when dry, and

Gypsophila paniculata. A lacy touch to both garden and bouquet.

one should perhaps take the precaution to hang each stalk separately, if they are to be combined in various bouquets later.

GRASSES

There are several ornamental grasses which produce attractive heads on long stalks, and that can add much to the charm of a dried bouquet. Several of these are perennials, a few annuals. Typical of the grasses, they need no special care except to be given room enough to develop. The perennial grasses are usually started from divisions, which are very easy to transplant. Seeds are, however, offered by some dealers.

Zebra grass or Eulalia *(Miscanthus floridula)* is a large perennial, forming clumps that grow 4–8 feet tall each season. The long-stemmed flower spikes are produced in late summer, and should be cut for drying when fully exposed from their sheaths, but before they begin to expand on the plant. As they dry the awned spikelets of the spikes expand, as well as the silvery hairs at the base of each floret, producing a graceful fluffy head 6 inches or more long and nearly as broad.

More beautiful is *Pennisetum alopecuroides,* a relative of the lovely fountain grass. It is perennial and may grow to 4 feet tall. The flower heads are silvery, to 6 inches long, with long bristles that give them a feathery appearance. These may be cut for drying anytime after they are formed, but before they mature and begin to "shed."

For smaller bouquets, the annual grass *Lagurus ovatus* is especially suitable. Seeds planted in the spring will produce plants about 1 foot tall which bear several dense wooly heads ½–1 inches long. These heads are so shaped that this species is sometimes called the "rabbit's foot" grass.

The next two species are very attractive in their summer growth, but it is their fruit that is of beauty for winter bouquets. They are, nonetheless, included here because of their easy culture and beauty.

LUNARIA ANNUA

Honesty or the money plant is a member of the cabbage family, and like so many of that group, is best treated as a biennial or winter annual —i.e., the seeds are sown in summer, young plants stand overwinter, then flower early in the following season. The plants grow to 48 inches tall, producing several flowering stems with showy purplish (or white) flowers. After flowering, the seed pods are developed. When they reach maturity, they are round or oval in outline, about as big as a half-dollar, and very thin. In development, these pods are greenish, but at maturity, the outer layers of the pod are shed, and the seeds with them. When this begins to happen, cut the entire stalk at the base, and permit it to season indoors. After the outer layers are shed, there remains the pearl-white membrane that had divided the pod. Though fragile, these fruiting stalks are long-lasting and of great beauty.

PHYSALIS ALKEKENGI

An outstanding perennial plant that deserves much wider cultivation is the Japanese lantern. It can be grown from seeds, but may not produce many "lanterns" until the second season.

Once established, however, the rhizomes persist year after year, and each season send up numerous leafy stems 8–24 inches tall. The white flowers are not very conspicuous, being borne in the axil of each leaf, commencing near the base and continuing one by one to the tip of the stem. After flowering, the calyx develops into an inflated "lantern" around each fruit which very much resembles a miniature tomato. At maturity the "lanterns" turn bright orange-red. They will remain very attractive on the plants throughout the remainder of the growing season. For drying, however, a stem should be cut at ground level when the uppermost "lantern" has changed color. The leaves should be *cut* off, and the stems permitted to dry while lying horizontal in a place where light is reduced. If desired, mature but green "lanterns" may be dried. Chewing insects will sometimes spoil the "lanterns," but occasional spraying with an insecticide containing DDT should prevent this. Though this species can spread fast, it is easy to control, and so desirable that I have no hesitation in recommending it for any garden. It will grow satisfactorily in partial shade or full sun, and in poor or rich soil. It should be noted that seeds are an easy method of propagation, the rhizomes being somewhat difficult to transplant when in active growth, and hard to locate when dormant!

After they are dry, individual "lanterns" may be removed from the stalks, cut along the angles, and opened back to expose the red fruit within, thereby creating the aspect of a flower. Fastened to a wire stem, such "flowers" are excellent for use toward the center of a dry bouquet.

The making of the winter "dry" bouquet is just as important as the growing of the correct species for this purpose. Naturally, any bunch of flowers is just *that*—unless you arrange them. Dried flowers do need somewhat more careful arrangement than fresh ones because of the lack of foliage. Fillers such as babysbreath are, therefore, most important. It is recommended to have wire at hand when working with dried flowers to lengthen stems or to change the angle of a flower on its stalk.

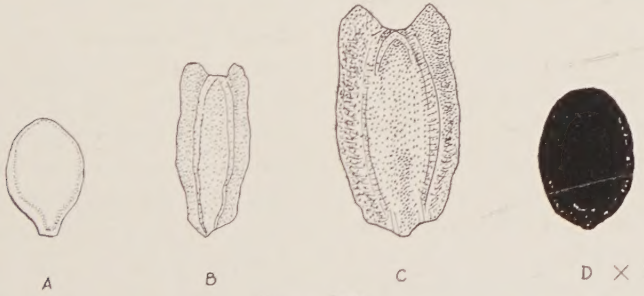
In addition to the garden flowers that can be used for winter bouquets, it is well to look about the countryside in summer and autumn for seed pods and other natural materials that can be used to add interest to your arrangements. Many of the wild grasses and sedges are excellent subjects, and the heads of wheat and rye are always lovely. Some persons collect small cattails in the early summer and dry them for use in winter arrangements, and the fruits of the lotus, bittersweet, iris, and mallow are some of the many other possible additions. In combination with appropriate container, pottery figure, or other desired inclusion, summer flowers carefully dried can be transformed into a work of beauty. Remember—it is a good idea not to use all of your flowers at once. Save some for new bouquets throughout the winter. It can be very rewarding to make a gay and colorful arrangement on a gloomy winter's day.

TRY GOURDS IN YOUR GARDEN

GOURDS of many sorts are easy to grow in St. Louis and like our warm dry summers. The vines need little room if they are grown over a fence, upon a trellis, or tied to strings or wires attached to the south or west wall of a building or fence. An arbor structure is ideal for growing gourds, for they grow well in the wind and sun. They will thrive in almost any soil but seem to do best in medium-rich loose soils. Frequent applications of water to supplement the rain and small amounts of fertilizer will produce a luxuriant growth of vines and cause the plants to bear larger fruits. Too much fertilizer will produce more vines with few fruits. After June, use fertilizers low in nitrogen and high in phosphorus and potassium. Seeds should not be planted until about May 5th, when the soil is warm, and the gourds must be harvested before frosts. Two or three seeds should be planted in each hill, with about four feet between the hills. Relatively few pests bother the gourds if they are growing over a fence or anywhere there is good air circulation. Rotenone or an all-purpose vegetable garden dust which does not contain DDT can be used, if necessary. Insecticides containing DDT should never be used on gourds, squash, cucumbers or watermelons, because they seem to harm members of this plant family. Seeds of many of the gourds may be purchased from seedsmen or from the Gourd Society of America, Horticultural Hall, Boston, Massachusetts.

Easiest of all the gourds to grow in St. Louis are the small yellow-flowered kinds which are closely related to our summer and acorn squashes. These little gourds, as all other gourd members of the genus Cucurbita, are similar to the many wild gourds native to the New World.

The only cultivated plant which was widely grown in both the Old and New Worlds before the Americas were discovered is the bottle gourd or calabash *(Lagenaria siceraria)*. It probably originated in the Old World, but more



GOURD SEED

A. The seed of the small yellow-flowered gourd *(Cucurbita pepo* v. *ovifera)* are cream-color and similar to those of the acorn and summer squashes.
B. The seed of the bottle gourd *(Lagenaria siceraria)* are tan or brown and have very small "wings."
C. Seeds of many of the large bottle gourds from the old world have large corky "wings."
D. Seeds of the luffa *(Luffa cylindrica* and *Luffa acutangula)* are black, elliptical in outline and have a thin sharp margin.

than 7,000 years ago it reached the New World, probably being carried by ocean currents, from Africa to South America. This is the gourd usually referred to when the word "gourd" is used, but the term "gourd" has been applied to many of its relatives whose fruits can be kept by drying, and even some relatives of the cucumber are called gourds. Certain tropical trees bear a fruit known as "tree gourds" or "calabashes," but most of these trees belong to the same family as our catalpa tree (Bignoniaceae) and not to the family of the true gourds (Cucurbitaceae).

There are many natural sizes and shapes of bottle gourds and even more variety can be introduced by tying the very young fruits with string or wire, or enclosing them in a bottle or box. Bottle gourds were used as containers for liquids and for the storage of seeds, cloth and many other things, long before pottery was made in the Americas. The gourds still are preferred in many places for carrying liquids in the fields because they are lighter than pottery and not nearly as fragile. Dishes, beehives and birdhouses are often made from them.

Not many people know that the very young fruits of the bottle gourd can be used for food. In Brazil the young gourds are called "abobra d'agua," which means water squash, and are used as we use young summer or zucchini squash.

August Hoh is one of the most active gardeners of the Webster Groves Men's Garden Club. Each year he tries several new things in his garden and, as a result, has won many prizes in his club's competitions. Last year he planted seeds he bought under the name of "vining okra." His plants turned out to be luffa which is also called vegetable sponge or dishrag gourd. This makes a good substitute for okra and has the advantage for some dishes of being not nearly as mucilaginous. In Africa, where both okra and luffa have been grown for centuries, luffa is called "long okra." Luffa is unusual for when it is dry, it consists of a mass of fibers surrounding the many flat, black seeds. The cultivated kinds are all native of the Old World, although a weedy species found in the South American Andes may be a true native of that region. Luffa fruits can be eaten when very young, and are the major ingredients of one of the best of the many Cantonese soups. The Cantonese name sounds like "sien gwa," and I have been told that it means "many threads."

If you want to gather a succession of young fruits to eat, you should not leave any mature on the vines, because the plant produces fewer new fruits if some are left to ripen. Should you want to save ripe fruits in the fall for flower arrangements, it is best to leave one vine with the fruits maturing for this purpose. All gourds should be dried in a well-ventilated place. If the small gourds are not perfectly dry, they will soon lose their color. Waxing, after the gourds are dry, helps to deepen the color. To make sponge from your luffas, the fruit should be beaten when it is dry so that the outer skin is broken and knocked off. The gourd can then be soaked in water until soft, and trimmed with a pair of scissors. —H.C.

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MISSOURI BOTANICAL GARDEN PROGRAMS

SPECIAL Shows and Displays

African Violet Show May 7 and 8

Spring Flower Show May 14 and 15

East Central Regional Flower Show May 21 and 22, Museum Building*

Rose Show May 21 and 22, Floral Display House

Free Nature Programs for children, aged seven and over are held every Saturday morning from 10:00 A. M. to 11:30 A. M., Museum Building

Plants from Prehistoric Times May 7

Planting Your Garden May 14

Color Sound Movies May 21

Plants with Wet Feet May 28

What Is a Tree? June 4

Exploring the Underworld June 11

The Queen of Flowers June 18

Shades of the Night June 25

COURSES

See September BULLETIN for courses offered in the Fall.

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* This is a portion of the program being put on by the East Central Regional District of the Federated Garden Clubs of Missouri at the National Home May 21 and 22.